

THE TREATMENT OF POSTURAL DEFORMITIES OF
THE TRUNK BY MEANS OF RAPID AND
THOROUGH PHYSICAL
DEVELOPMENT.¹

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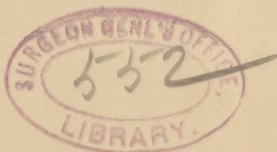
OF NEW YORK.

THE generally unsatisfactory results which have been attained by the different methods in vogue of treatment of the postural deformities of the trunk—viz., round shoulders, round back, hollow chest, pigeon breast, one-sided deformity of the costal cartilages, stoop shoulders, antero-posterior curvature, and rotary-lateral curvature—have led me, at the suggestion of Dr. Virgil P. Gibney, to lay before this section my theoretical deductions, which, practically applied, have resulted in a rapid improvement, and, in several cases, a complete cure.

I start from the stand-point that all of these deformities which may arise primarily from any of the following causes—viz., pleurisy with adhesions, empyema, section of the ribs, paralysis from different causes, rickets, irregularities of the extremities, faulty attitudes, neuroses, etc.—are permitted to develop only by weakened or rudimentary conditions of the muscular systems generally, or of certain muscular groups in particular.

There must be, to the knowledge of every one present, a vast number of cases where some one or more of these primary causes exist, and in which the muscular systems were sufficiently strong and active to overcome any tendency to the improper development of the trunk.

¹ Read before the Orthopædic Section of the New York Academy of Medicine, May 17, 1895.



Assuming the theory advanced to be correct, it would be only a logical sequence to thoroughly develop and educate the general muscular systems, not only in those cases where the tendencies to deformities are known to exist, but also where deformities, whether habitual or fixed, are present, so that they may be cured, improved, or prevented from becoming worse.

All orthopædists are agreed that exercises, when properly given, are beneficial, but the degree of benefit must necessarily depend upon the muscular ability and the strength and the will of the individual patient to correct, or to partially correct, a faulty attitude or a deformity.

In considering the question of muscular development, I wish to state that I have renounced and discontinued all supporting and immobilizing appliances, as described in my paper,¹ in any and all cases which I consider amenable to treatment.

The objection to all supporting appliances is that each and every one will, to a greater or less extent, interfere with the mobility of the spine, and in that manner deprive the back, chest, and abdominal muscles of that perfect freedom of action which is a necessary and powerful adjunct in the successful treatment by gymnastics. In the treatment of deformities, the aim is and has been to correct the deviations from the normal by such exercises as will educate the different groups of muscles to sufficient and proper exertion, to enable the patient to assume as nearly as possible a normal attitude. This muscular education is dependent upon strength and development, without both of which we must largely fail to obtain that proper and vigorous muscular action upon which any beneficial results from corrective exercises must depend. Therefore, it is necessary and imperative, in all cases which require or are amenable to treatment, to attain the highest type of development possible of the entire body, to render the spine mobile in all directions, and also to develop the full strength of each patient. Individual work only can accomplish this end, because it is of the highest importance to carefully watch every

¹ Observations on the Rotary-Lateral Curvature of the Spine, with Special Reference to the Etiology and Treatment, read before the Surgical Section of the Pan-American Medical Congress at Washington, D. C., September 5, 1893.

movement of the patient and to immediately correct any and all errors in attitude, deportment, or exercise.

Before describing the system which I employ in the development of muscle and the attainment of strength, I wish to especially advise against the gymnasium training of any patient afflicted with any deformity or a tendency to one. There is no doubt that very many of those who regularly attend gymnasium classes do develop in physique, but I claim that only those few who are muscularly apt will, after long training, show a fairly good general development. The fault lies in the class training, in the general exercises, and in the uninstructed use of the different apparatuses. Feats of different kinds are attempted and accomplished, but the manner and means employed, whether awkward or otherwise faulty, count for nothing and are rarely corrected. I will show these statements to be facts. I will present a male patient to you this evening, who has attended one of the Y. M. C. A. gymnasia of this city for about two years prior to February 17 last.¹ He is now fifteen years old, has always been perfectly well, but considerably undersized. Prior to his work in the gymnasium he attended a military school, and I am told that his deportment and carriage were always good. It was only recently that the observant instructor at the gymnasium which he attended noticed a slight curvature of the spine of this boy and called his attention to that fact. The patient in turn informed his parents, who brought him to my office for my opinion and advice. I found a slight lower dorsal curve of the spine, the angle of the right scapula more prominent than the left, the left shoulder higher than the right, the ilio-costal curve greater on the right side than on the left, the shoulders drooping and falling forward, the right more than the left, and the linea alba deviating below to the right. The pectoral and abdominal muscles were very much better developed on the right side, and the back muscles on the left. The arms presented a striking appearance; the biceps muscles of both arms, the right larger than the left, were developed out of all proportion to the other muscles of the arm and forearm, causing both forearms to be slightly flexed upon the arms when in repose.

¹ See Case VIII.

Full extension of the forearms, especially above the head, required considerable of an effort, showing that the overworked biceps and the undeveloped extensors produced the condition known as "muscle-bound." The patient was requested to demonstrate how he used the dumb-bells and Indian clubs in his class exercises. The movements were very rapid, inaccurate, jerky, without rhythm, and violent; so violent in fact that his entire body received a thorough shaking up with every movement of the upper extremities. A lack of control for fixation of the muscles of the neck, trunk, and lower extremities was evident.

The patient was requested to stand erect, the heels together, the toes apart, holding the chest high, the shoulders back, the abdomen retracted, the lower extremities fully extended, the arms downward close to the side of the body, and the forearms pronated, holding a two-pound dumb-bell in each hand. He was then told to flex the forearms alternately upon the arms to the shoulders, the elbows remaining immovable, close to the sides of the body, and the forearms remaining pronated. This the patient could not accomplish, because he could not, even with the greatest effort, control the pronators and the flexors at the same time. In endeavoring to flex them he invariably supinated the forearms to enable him to do so, and even then he wriggled his entire body, his shoulders dropped forward, the abdomen became prominent, his knees were flexed, and his feet shifted. His attitude, muscular condition, and inability to exercise properly and correctly fully demonstrated to me his faulty gymnasium training. When treatment, which was advised, was commenced, it was found more difficult to teach him and to correct his faults than any other patient who came under my care. But when he grasped the separate exercises and was able to execute them with grace and ease, very rapid improvement in his carriage was evident to his parents, to myself, and to others with whom he came in contact. The actual general changes in this patient you will notice in his chart.

Before treatment is begun the patients are weighed and measured, and the different strength tests are applied. All these data are recorded upon the anthropological charts, as devised by

Dr. Sargent, of the Heminway Gymnasium, at Cambridge, Mass. Photographs are also taken, if convenient, or if there be sufficient actual deformity to show in a picture.

The important points to be observed in the development of strength and muscle are correct attitude, ease and grace and rhythm of motion, and automatic and independent and full action of only those groups of muscles which are called into play by the performance of each separate exercise, and each group of muscles automatically exercised until it is thoroughly tired. No muscle can be properly developed unless it is tired by frequent and uninterrupted automatic contractions and relaxations.

All exercises with light weights should be executed in a closely-fitting jersey suit, before a mirror, so that the patients can hold themselves in the proper position while going through the different movements. By doing this they can see when the position is faulty, either by reason of a sagging of the trunk or through the lack of co-ordination of all those muscles which are to remain fixed while certain groups are in action, and they can correct their faults. It also materially assists in the acquisition of grace and ease in working automatically. Exercise in this manner brings about a forced and habitual corrected pose and carriage, while the strength and muscles necessary to maintain a correct position are being developed. Taking the stand-point that,—

- (1) Lack of strength and lack of muscular development;
- (2) Habitual faulty position with superimposed weight; and,
- (3) Lack of co-ordinating power or lack of muscular control,

are the more potent etiological factors in producing deformities, it is and has been my aim—and I believe that I have succeeded—in correcting deformities by reversing these conditions,—that is,

- (1) By developing the muscles and their strength;
- (2) By acquiring an habitually corrected position with superimposed weight; and,
- (3) By educating all the muscles to proper co-ordination and to complete control.

A pair of dumb-bells, weighing from one-half to five pounds

each, according to the ability of the patient, is used in a series of twenty-six exercises.

I would state here that this method is a systematic classification of the work employed by that renowned German athlete and strong man, Louis Attilla, the trainer of "strong men," who by his instruction is reputed to be responsible for the successes of many athletic celebrities, including Sandow.

The Exercises.—The patient stands erect, the heels together, the toes apart, the knees thoroughly extended, the abdomen retracted, the chest high, the head well poised, and the patient

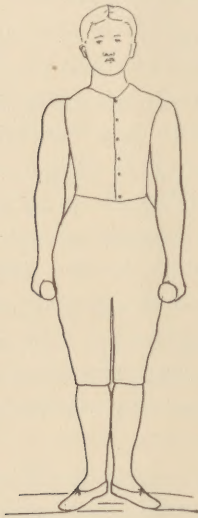


FIG. A.

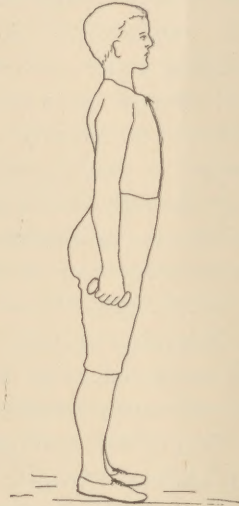


FIG. 1a.

looking intently and sharply into his or her own eyes in the mirror, the lips being evenly, but not too firmly, closed, and the facial muscles in repose. The patient should breathe easily and regularly while exercising. (Figs. A and 1a.)

(1) The upper extremities are fully extended downward, the forearms supinated, the elbows remaining close to the sides of the body, and the upper arms being fixed; the forearms are alternately and automatically fully flexed and extended, the wrists and entire body being fixed and immovable. Twenty to fifty times. (Fig. 1.)

(2) The same position and exercise, except that the forearms are fully pronated, and remain so during alternate flexion and extension. Twenty to fifty times. (Fig. 2.)

(3) Both bells over the shoulders, the arms abducted at right angles to the body and in the same vertical and horizontal planes, the forearms fully flexed upon the arms, and the wrists fully flexed upon the forearms. The forearms and wrists are then alternately and automatically extended and flexed. Ten to twenty times. (Fig. 3.)

(4) The same position and exercise, except that both upper

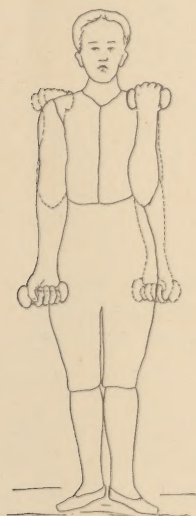


FIG. 1.

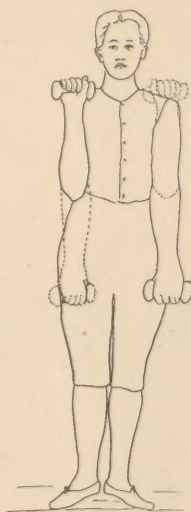


FIG. 2.

extremities are flexed and extended at the same time. Five to fifteen times. (Fig. 4.)

(5) Both upper extremities fully extended forward on a level with the shoulders, the dorsum of the hands outward. They are then fully and forcibly abducted on an horizontal plane, raising the patient's body upon the toes, and then permitted to recede to the original position, the body resting on the toes and heels, the elbows and wrists still rigid, and the bells not being permitted to touch as they approximate each other. Five to ten times. (Figs. 5a and 5b.)

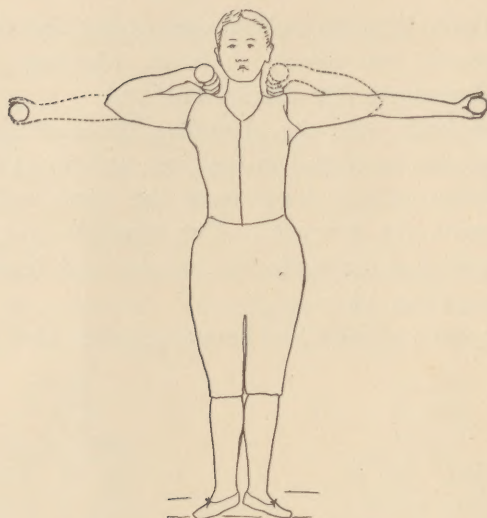


FIG. 3.

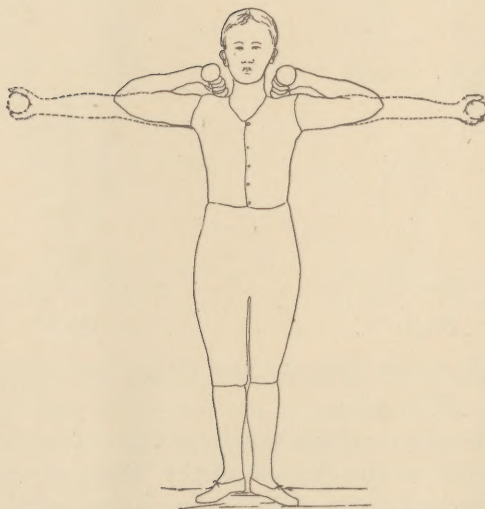


FIG. 4.

(6) Bells in the position of exercises No. 3 and No. 4. The arms are fully extended alternately above the head. Ten to twenty times. (Fig. 6.)

(7) Bells in front of the thighs, forearms pronated, and bells



FIG. 5a.

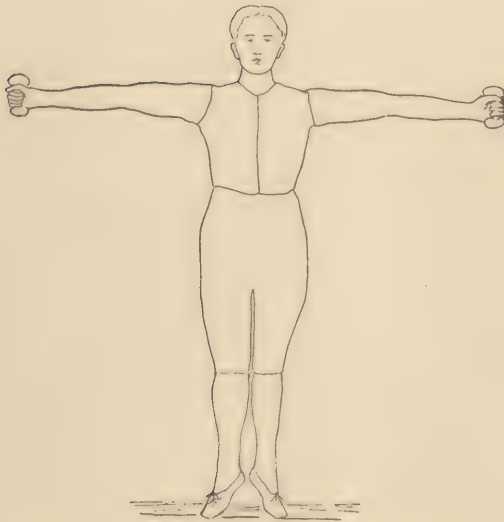


FIG. 5b.

alternately raised to the level of the shoulders, the elbows and wrists being fixed. Ten to twenty times. (Fig. 7.)

(8) The arms abducted at right angles to the body, the bells rotated rapidly and forcibly forward and backward, the elbows being fixed. Five to ten times. (Fig. 8.)

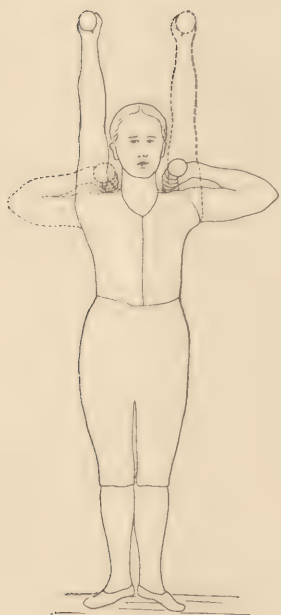


FIG. 6.

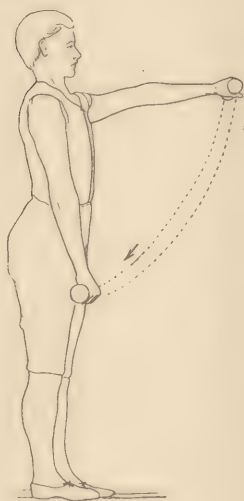


FIG. 7.

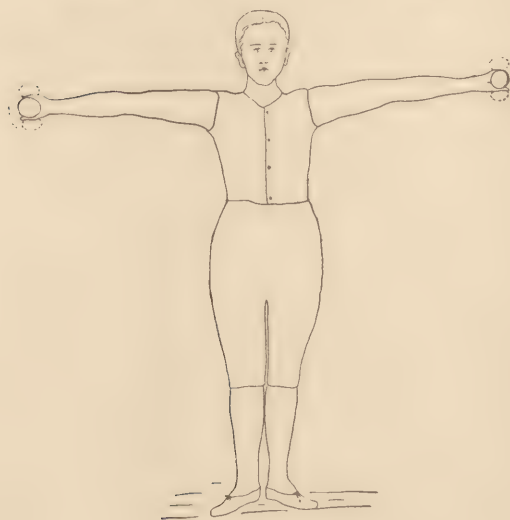
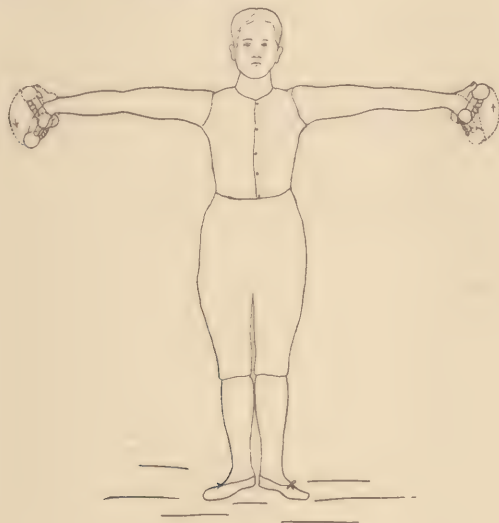


FIG. 8.

(9) The arms abducted at right angles to the body, the thumbs upon one ball of each bell, the hands circumducted for-

ward from above downward, the ball upon which the thumbs rest describing circles, the elbows and shoulders being fixed. Five to ten times. (Fig. 9.)



FIGS. 9 and 10.



FIGS. 11 and 12a.



FIGS. 11 and 12b.

(10) The same as No. 9, the hands being circumducted backward. Five to ten times. (Fig. 10.)

(11) The bells to the side. Right face upon left heel, then placing the left foot at right angles to right foot opposite the arch, the knees slightly flexed, the right hand at waist-line against the body, the bell being perpendicular. Second part of motion: strike from the shoulder to level of the face, advancing a step upon the left foot, rapidly extending the right thigh and leg, the right foot being fixed upon the floor, and quickly back to position. Ten to fifteen times. (Figs. 11 and 12a and 11 and 12b.)



FIG. 13a.



FIG. 13b.

(12) Exactly the reverse of No. 11. Ten to fifteen times. (Figs. 11 and 12a and 11 and 12b.)

(13) Bells extending above the head, palmar surfaces looking forward, bending down to the floor, the knees remaining extended, and return. Five to fifteen times. (Figs. 13a and 13b.)

(14) Bells downward at the sides, raising and dropping the shoulders. Ten to twenty times. (Fig. 14.)

(15) Bells downward at the sides, flexing the spine laterally,

first to the right and then to the left. Ten to twenty times.
(Fig. 15.)

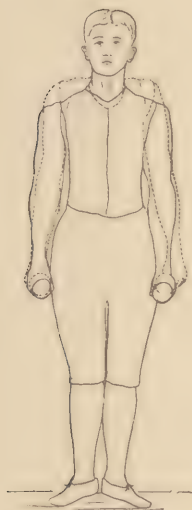


FIG. 14

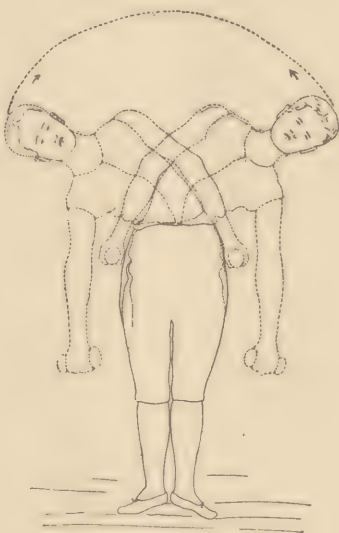


FIG. 15.

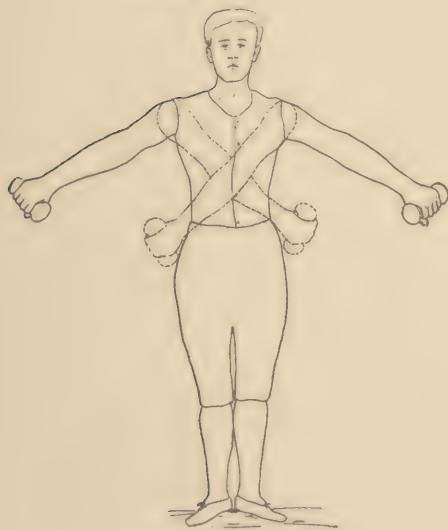


FIG. 16.

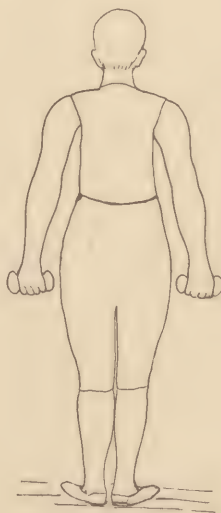


FIG. 17a.

(16) Both arms extended forward about forty-five degrees and abducted at about the same angle, then forcibly crossed in

front of the chest, causing the pectoral muscles to contract vigorously, the elbows and wrists being fixed, and then back to the original position, Five to twenty times, alternating the right and left hands above. (Fig. 16.)

(17) Bells at the sides, palmar surfaces looking forward. Extend arms backward in a vertical plane as forcibly as possible, holding them rigid in the fully extended position for a few moments, and then returning the bells to the sides. Five to fifteen times. (Figs. 17a and 17b.)

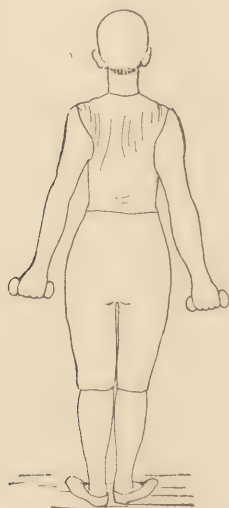


FIG. 17b.

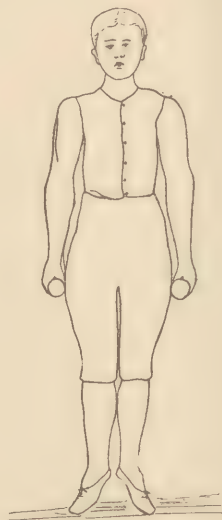


FIG. 18.

(18) Bells to the sides. Raise the body upon the toes and backward to original position. Ten to twenty times. (Fig. 18.)

(19) Same position. Raise the toes as far as possible from the floor, the body remaining erect. Ten to twenty times. (Fig. 19.)

(20) Same position. The patient squats, abducting the knees and resting upon the toes, the heels being raised, the trunk perfectly erect, then resuming first position. Five to twenty times. (Fig. 20.)

(21) Same position. Standing upon left foot. Flexing the right thigh at a right angle to the body, extending the knee and

ankle fully. The patient squats on the left ham, the left heel remaining upon the floor, and then resumes the first position. Two to five times. (Figs. 21 and 22.)



FIG. 19.



FIG. 20.



FIGS. 21 and 22.



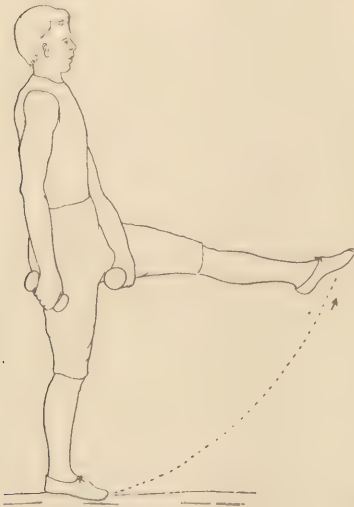
FIG. 23.

(22) The same, standing upon the right foot. Two to five times. (Figs. 21 and 22.)

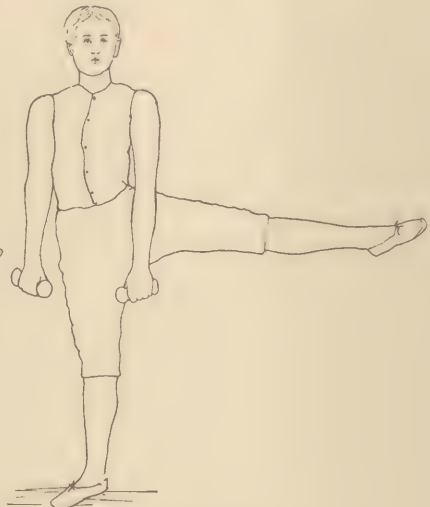
(23) The same position. Alternately and forcibly flexing the thighs and legs, causing the knees to touch the shoulders. Ten to twenty times. (Fig. 23.)

(24) The same position as in No. 21, extending the right lower extremity, the right bell inside the thigh, the right foot moved in a circle on an horizontal plane to complete extension backward, and resuming the first position. Two to five times. (Figs. 24 and 25a, 24 and 25b, and 24 and 25c.)

(25) The same as No. 24, standing upon the right foot. Two to five times. (Figs. 24 and 25a, 24 and 25b, and 24 and 25c.)



FIGS. 24 and 25a.



FIGS. 24 and 25b.

(26) The patient lying supine upon the floor, the lower extremities fully extended, the bells resting upon the chest, then raising the trunk to the sitting position, the lower extremities remaining extended, and the eyes being fixed upon the ceiling, and returning to the original position. Five to twenty times. (Fig. 26.)

When the patient is proficient in these exercises, they should be done at home every morning and evening. In addition to these development exercises, I give the patients work with heavy

bars and dumb-bells at each visit to my office. The weight of the bars and bells, the number of times that each heavy weight or pair of weights is handled, and the frequency of the patients' visits depend upon the strength, capacity, and upon the endurance of the individual. It has been my practice to put each patient to his or her individual limit of work at each *séance*, and that limit is invariably extended at each succeeding *séance*, unless the patient is indisposed. The strength and endurance, as shown by the amount of weight handled and the number of times each weight and set of weights is handled, increases very markedly in every case from



FIGS. 24 and 25c.

one visit to another. This increase is largely dependent upon correctness of posture and precision in the work. This is a matter of record in all my cases, as I keep a tabulated statement of all the work, designating the weights used, and the exact number of times each exercise has been performed. In reporting my cases, I shall, as an illustration, append the record of work in one case (Case IX). Bells weighing from five to forty pounds each and steel bars weighing from twenty-six to seventy-eight pounds are used in different ways. Bells are pushed from the shoulder above the head alternately, as often as the patient can.

The patient is instructed to swing a heavy bell with one hand from the floor, above the head and down again, the elbow and wrist being fixed and the motion repeated as often as possible in a systematic manner; then with the other hand, the same number of times; and later with both. This exerts all the extensor muscles from the toes to the head in rapid succession.

When a heavy bell is pushed or swung above the head on the side opposite the scoliosis, the action of the back muscles, to sustain the weight and equilibrium, is such as to cause the curved spine to approximate a straight line. A similar result is produced when a heavy weight is held by the side of the erect body on the scoliotic side, the arm being at full length.



FIG. 26.

When a heavy bar is raised above the head, with both hands, the patient must fix the eyes upon the middle of the bar, to maintain an equilibrium. This necessitates the bending of the head backward, the straightening and hyperextending the spine, and consequently correcting a faulty position with a weight superimposed. The heavier the weight put above the head, whether with one hand or with two, the more the patient must exert himself or herself to attain and maintain a correct or an improved attitude in order to sustain the equilibrium. (By an improved attitude, I mean the greatest amount of correction of the deviation of the spine that the fixation of a deformity will allow of.) Hence, the greater the weight, the more forcible the actions of the muscles become, and the greater the temporary reduction of

a deformity. It is by means of frequent and forcible temporary reductions of deformities, by voluntary muscular action, that we can hope to improve and do improve those cases which are amenable to any form of active treatment.

When a patient, lying supine upon the floor, raises a heavy bar above the head so that the arms are perpendicular to the floor, the weight of the bar, the position and weight of the body, and the action of the muscles tend to broaden the entire back and shoulders, and a slow downward movement tends to widen the entire chest, and most markedly at the shoulders. The frequent repetition of the upward and downward movement plays



FIG. 27.—Tracing of back of Case III at point of greatest deformity. Solid line tracing taken November, 1894, after plaster-of-Paris jacket had been worn. Broken line tracing taken by Dr. Newton M. Shaffer, at the meeting of the Orthopædic Section of the New York Academy of Medicine, May 17, 1895.

an important part in the rapid development of the chest and back. Pushing the bells above the head, swinging them with each hand separately and with both hands together, raising a bar above the head, standing and lying down, and the exercises before enumerated, constitute one day's work.

As the amount of work performed by a patient depends upon the last previous record of that patient, that record must be improved upon at each succeeding visit, unless there be a good and sufficient reason to the contrary. Most patients can well stand three treatments a week. In mild, habitual cases improvement in deportment is noticed by the patients' relatives and

friends and by the patients themselves, within the first two weeks. In those cases twenty *séances* usually suffice to effect a complete cure. In the more severe cases it is not and cannot be expected to attain such rapid results, but a certain appreciable improvement is effected, and I believe that the amount of improvement depends upon the persistent continuance of the treatment. Where there is a fixed rotation of long standing, with bony and ligamentous changes, the prospects are not so good, but even in those cases, I am sure that I can show considerable improvement in their conditions.

Patients are not permitted to wear supports of any kind, not even corsets. They should not exercise until at least two hours after a meal, nor when menstruating. The general health is improved by the exercises, the patients gain in height and weight. The girths and breadth measurements, chest depth, strength tests, and lung capacity are generally increased, and the depth of the abdomen is usually decreased. In some cases, especially those of undersized patients, the increase in height is very rapid, and it is certainly more than the increase by ordinary growth. There were marked cases of flat-foot which were benefited, as will be seen by reference to the charts. The flat feet became shorter through the exercises by the increase in depth of the inner arches.

This system of work should only be applied by the physician, and he must himself have been trained to the work, to intelligently guide those whom he seeks to benefit. The work must be careful, systematic, and regular. Perfunctory work will not do.

REPORT OF CASES TREATED.

CASE I.—Dorothy S., aged six and a half years. Patient had a very marked protrusion of the sterno-costal cartilages on the right side. The deformity was so great as to be plainly visible when the child was dressed. The eminence formed was fully an half inch above the level of the chest. Treatment was begun December 4, 1894. Patient, despite her youth, was apt, quick, and attentive, and progressed very favorably. Her work was interrupted by being ill with diphtheria, which left her weak for some time. She worked thirty times from December 4, 1894, to April 20, 1895, and her record of work on the latter date was the following, viz. : Exercise with two-pound bells.

December 6, 1894.

May 6, 1895.

	FIRST MEASURE	MINIMUM	ABOVE											MAXIMUM	LAST MEASURE	
			95	90	80	70	60	50	40	30	20	10	5			
			BELOW													
			5	10	20	30	40	50	60	70	80	90	95			
Age.....	63.240													7400	Age	
Weight.....	22.7													22.8	Weight	
Height Standing.....	1190													1183	Standing Height	
" Sitting.....	64													64.4	Sitting "	
" Knee.....	28.5													27.6	Knee "	
" Pubic Arch.....	55.5													56.5	Pubic Arch "	
" Sternum.....	92.8													93.6	Sternum "	
Girth Head.....	50.8													51.5	Head Girth	
" Neck.....	24.2													25.5	Neck "	
" Chest.....	50.2													54.0	Chest "	
" " Full.....	57.0													61.5	F " "	
" Waist.....	50.2													50.5	Waist "	
" Hips.....	62.2													66.0	Hips "	
" Thigh R.....	36.8													37.0	R Thigh "	
" " L.....	36.2													37.0	L " "	
" Knee R.....	25.7													27.0	R Knee "	
" " L.....	25.4													27.0	L " "	
" Calf R.....	24.5													26.0	R Calf "	
" " L.....	24.2													26.0	L " "	
" Instep R.....	17.5													18.0	R Instep "	
" " L.....	17.4													18.0	L " "	
" Up Arm R.....	16.8													20.5	R Up Arm Girth	
" " L.....	16.5													20.0	L " " "	
" Elbow R.....	16.9													17.5	R Elbow "	
" " L.....	16.0													17.5	L " "	
" Fore Arm R.....	16.6													18.5	R Fore Arm "	
" " L.....	16.6													18.5	L " "	
" Wrist R.....	14.5													12.5	R Wrist "	
" " L.....	14.1													13.0	L " "	
Depth Chest.....	14.0													14.10	Chest Depth	
" Abdomen.....	15.2													15.3	Abdomen "	
Breadth Head.....	14.2													14.3	Head Breadth	
" Neck.....	8.0													8.0	Neck "	
" Shoulders.....	26.7													27.4	Shoulders "	
" Waist.....	17.44													16.5	Waist "	
" Hips.....	22.0													21.0	Hips "	
Shoulder-Elbow R.....	24.2													24.4	R Shoulder-Elbow	
" " L.....	24.2													24.4	L " "	
Elbow-Tip R.....	30.7													31.3	R Elbow-Tip	
" " L.....	31.2													31.5	L " "	
Length Foot R.....	19.8													20.4	R Foot Length	
" " L.....	19.8													20.5	L " "	
" Horizontal.....	118.0													120.1	Horizontal "	
Stretch of Arms.....	116.0													118.6	Stretch of Arms	
Capacity Lungs.....	56.9													70.0	Lungs Capacity	
Strength Lungs.....	0.4													0.7	Lungs Strength	
" Back.....	23.9													35.0	Back "	
" Legs.....	25.0													45.0	Legs "	
" Chest.....	50.0													80.0	Chest "	
" Upper Arms.....	0.0													0.0	Upper Arms "	
" Fore Arms.....	10.0													12.0	Fore Arms "	
" Total.....	63.2													100.7	Total "	
Development.....															Development	
Vision.....															Vision	
Hearing.....															Hearing	

(Dr. Sargent has no chart for plotting averages under 10 years.)

CHART No. I.

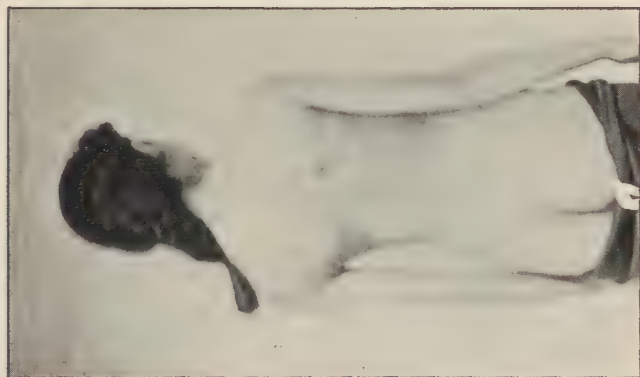
Pushed two ten-pound bells sixty times ; two eight-pound bells eighty times ; swung two ten-pound bells eight times, swung one twelve-pound bell twenty times with each hand, and raised a twenty-six pound bar ten times above the head standing and fifteen times lying down.¹ Now the former protrusion is hardly noticeable, and she can cause it to disappear entirely by posture. This I consider a good result with a deformity that is generally acknowledged to be almost unmanageable. Unfortunately, I have no photographs. I have taken measurements, but Dr. Sargent has no charts for "plotting" percentages under ten years of age. (See Chart No. 1.)

CASE II.—Martha S., aged fifteen years ; December 4, 1894. Had well-marked **S**-curve, dorsal to the right. Patient was under treatment by light gymnastics about two years ago. She was awkward, indolent, lazy, slow of perception, and took no interest in her work. Frequently she absolutely refused to do anything that required an effort, simply saying, "I can't." Her visits to my office were very irregular, and she did not visit me after March 30, except on May 4, when she came, at my request, to be measured and photographed. An half-inch cork sole for right shoe was ordered, which patient would not wear. Her first photograph, which was taken in November, 1892, is unsatisfactory, but it will show her deformity at that time. She has materially improved. She exercised with three-pound bells. She pushed two twenty-pound bells sixty times ; swung one twenty-five-pound bell fifty times with each hand, and two twenty-five-pound bells twenty times, with both hands, above the head, and raised a fifty-pound bar ten times above the head standing and eighteen times lying down. (See Chart No. 2, and photographs.)

CASE III.—Sophie C., aged nine years ; December 3, 1894. Had a firmly-fixed and severe **S**-curve, the dorsal convexity to the right. This patient has been deformed, and under various forms of treatment since she was fourteen months old. She was an inmate of the Hospital for Ruptured and Crippled from March to October, 1894. Her history and measurements were taken when she was admitted to the hospital, and she was measured at the hospital upon the same lines through the kindness of Dr. Gibney, on April 25, 1895. I will give the measurements, as taken from "History Book No. 2," of the Hospital for Ruptured and Crippled, p. 38.

"March 5, 1894. Left ilio-costal curve higher than normal and very deep, the skin wrinkled in ridges extending obliquely from inferior

¹ The patient was presented for examination.



Photographed Nov., 1892.

CASE II.



Photographed May 4, 1895.



Showing lax standing position, April 16, 1895.

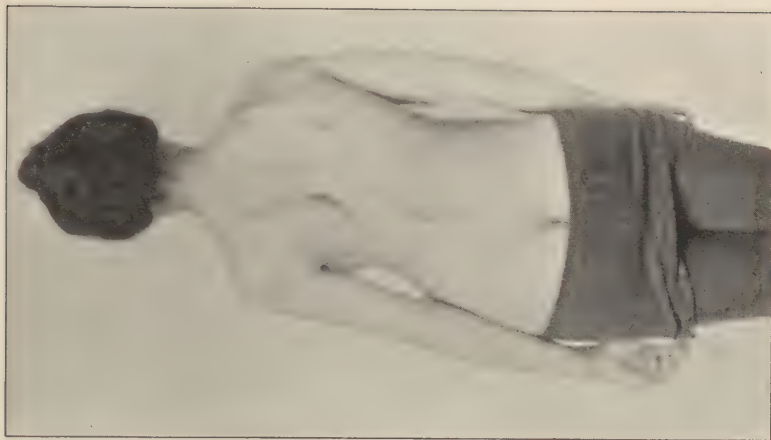


Showing improved posture by voluntary effort, April 16, 1895.

CASE III.



CASE III.
Showing correction in "keynote" position, Apr. 16, 1895.



CASE IV.
Patient standing as erect as possible, Mar. 12, 1894.



Reverse of "keynote" position, showing extreme rotation, March 12, 1894.



Partially showing the extent of fixed scoliosis, March 12, 1894. The camera was placed on too high a level to show the full extent of protrusion of ribs.



Standing, showing present deformity, April 16, 1895.



Standing, showing corrected posture, April 16, 1895.

CASE IV.



Reverse of "keynote" position, showing extreme rotation, April 16, 1895.



Showing the full extent of present scoliosis, April 16, 1895. The lens of the camera was on a level with the middle of the body.

CASE IV.



Showing back after treatment, April 18, 1895.



Showing back after treatment, April 18, 1895.

CASE VII.



Natural position, Feb. 17, 1895.

CASE VIII.



Natural position, Feb. 17, 1895.



Erect position, but not forced, April 23, 1895.



Erect position, April 23, 1895.

CASE VIII.



Showing development of the back, April 23, 1895. To be compared with photograph of the same date showing the naturally erect position.



Showing muscular development of back, April 23, 1895. CASE VIII.



Showing deformity, April 6, 1895.



Showing deformity, April 6, 1895.

CASE IX.



Showing result of treatment, May 14, 1895.



Showing result of treatment, May 14, 1895.

CASE IX.

angle of left scapula to left anterior superior spine: Inferior angle of left scapula one and a half inches lower than the right, but hugs the

December 6, 1894.

May 4, 1895.

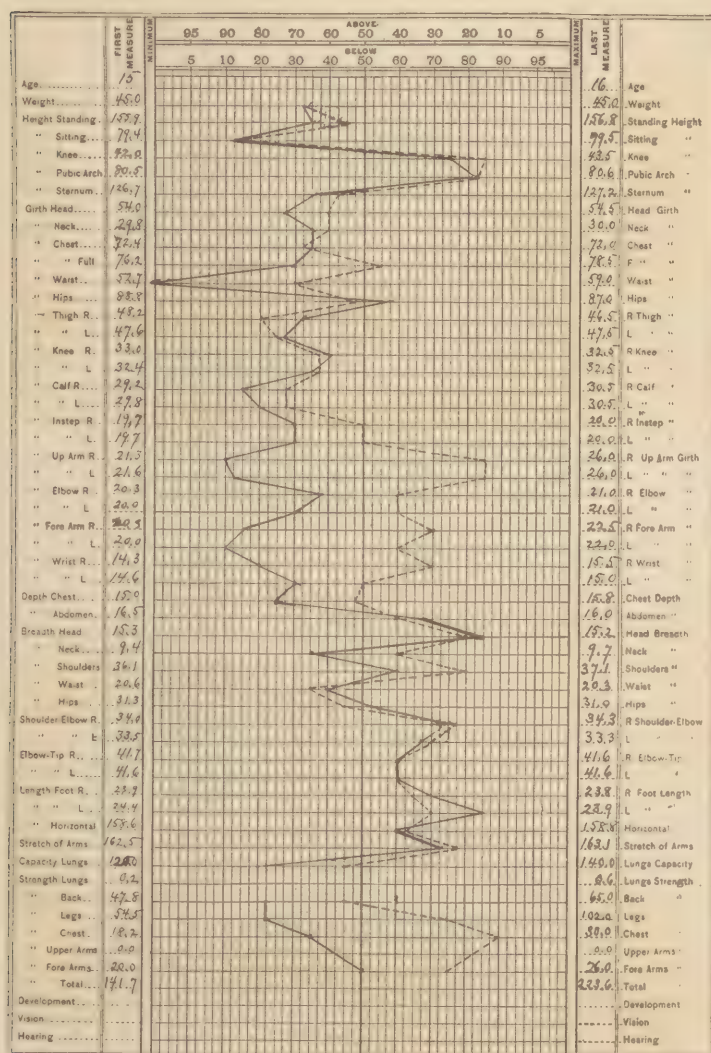


CHART No. 2.

chest wall closely, as does the right. Ribs on the right side project backward from centre of right scapula to level of right elbow. At

centre of curve which is the seventh or eighth dorsal vertebra, they project one and a half inches behind those of left side. Costo-iliac curve on right side obliterated. Head inclined to right shoulder.

"In front. Left mamma and chest prominent, right flattened, left shoulder lower and thrown backward. Anterior superior spine on left side elevated. Key-note position has little effect on curve. *Stooping.*—Rotation well marked. Ribs on right side two inches higher at centre of curve than on the left.

"Little effect produced by pressure on ribs of right side at the same time supporting the left shoulder."

I understand that these measurements were taken, the patient lying prone upon a table. The words "in front," I take to indicate that the patient was lying upon her back.

From the time of her admission she was given light gymnastics by me almost daily until the middle of June, after which she was exercised by the then house surgeon, Dr. Winter, until about August 1. Dr. Winter believed that she had markedly improved from the time of her admission until the middle of June; he believed that she was at a stand-still while he had her under his treatment, and he further stated that she became worse from August 1, when exercises were discontinued, until she was discharged from the hospital in a fixed plaster-of-Paris jacket.

December 3, 1894, she returned to me, at my request, for private treatment, to see what could be accomplished in such a severe and long-standing case, by heavy gymnastics and exercises only, and without support. I ordered, however, the shoe of the right foot raised one inch, to throw the weight more upon the left foot.

Work was commenced December 3, 1894. The patient was very willing, but awkward, and teaching her was laborious. The extreme deformity, its fixation, the duration, the immobility of the spine, and the severe rotation were such that I could not hope to make any great change in the contour of her trunk by active treatment.¹ I reasoned, however, that if I could only slightly improve her condition, I could certainly very much improve milder cases. The patient has improved, although the work was seriously interfered with by frequent toothaches and indispositions. (She is a child of poor parents, and it is my opinion that proper nutriment has been wanting.) Her spine is mobile. She can now hold herself in a comparatively good position. She has gained a great deal in strength, and to my eye her deformity

¹ See tracing.

appears less marked than when treatment was begun. She was photographed at the hospital, and I was not in a position to photograph her when she began treatment with the heavy work. Her record in this regard is imperfect.

I quote from "Ward Book" of the hospital, p. 697.

"April 25, 1895. General condition much improved. Been under Dr. Teschner's treatment since discharge from hospital. Comes in for examination to-day, one inch cork on right foot.

"Left shoulder markedly lower than the right. Left ilio-costal curve higher than normal and very deep. Lower angle of left scapula on a plane one and a quarter inches lower than right but hugs chest closely.

"Chest walls one and a half inches higher on right than left. Chest in front flattened and free ribs very prominent. Key-note corrects somewhat."

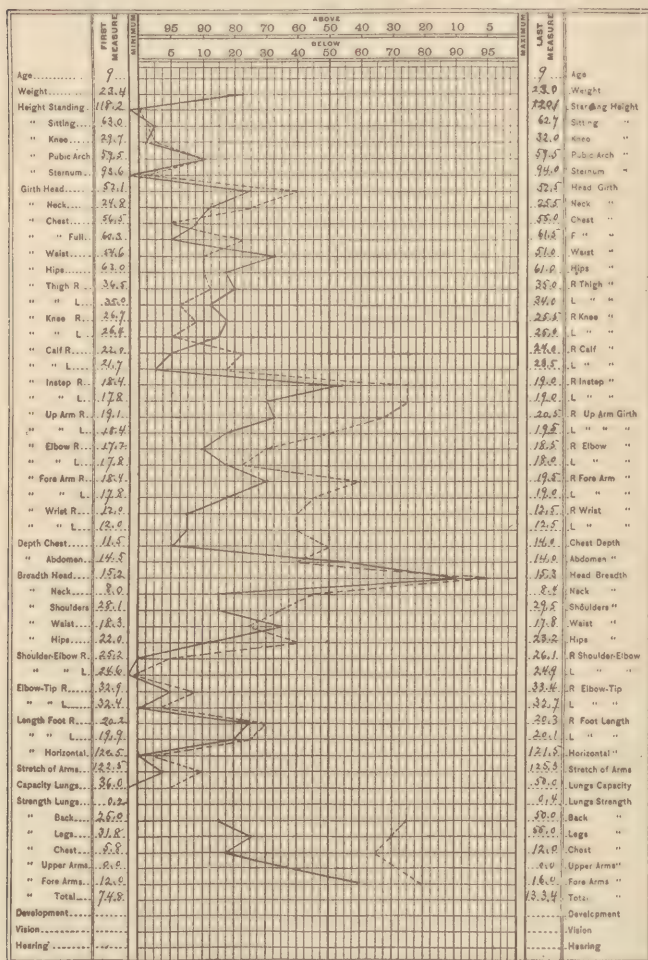
The hospital record, although meagre and vague, shows improvement in the general condition and actual improvement in the deformity. Over a year had elapsed between the two observations, and the patient certainly grew in that time. My record shows an increase of 1.9 centimetres from December 6, 1894, to April 16, 1895. Ordinary growth and development of a child with a deformity, even though the progress of the deformity were at a stand-still, would, by increase in the size of the skeleton, cause the measurements of the comparative heights of the scapulæ, and of the differences of the elevated and depressed planes of the surfaces of the chest wall, to become greater. In this case the record shows that, at both examinations, the right chest wall (back) was one and a half inches more prominent than on the left; that the angles of the scapulæ, which were on planes one and a half inches apart at the first examination, were one and a quarter inches apart on the second examination. The first record says, "Key-note position has little effect on curve;" the second record says "Key-note corrects *somewhat*." One measurement has not varied, which, to my mind, indicates progress, and the other has improved one-quarter of an inch, which indicates still more progress. The second observation records a flat chest, while the first records the left side of chest prominent. I will show the key-note correction. By request, Dr. Shaffer took a tracing of the patient's back. (See tracing.)

Her strength tests and lung capacity have increased, as can be seen by her chart. She exercises with a pair of two-pound dumb-

bells. She pushes a fifteen-pound bell thirty or more times from the shoulder above the head, she swings a twenty-pound bell with one hand, and two fifteen-pound bells with both hands above the

December 6, 1894.

April 16, 1895.



(Plotted on 10 year chart.)

CHART No. 3.

head. She raises a thirty-six-pound bar above the head ten times standing, and a fifty-pound bar twelve times above the head lying down. All this she will demonstrate. Since March 12, I con-

cluded to give her more left-handed pushing and swinging. Until May 1 she has exercised forty-five times. (See Chart No. 3 and photographs.)

CASE IV.—Lillie L., aged sixteen years; December 13, 1894. Had a firmly fixed S-curve, the dorsal convexity to the right, similar but less severe than Case No. 3. This patient has also been under different kinds of treatment for the past four years. From March 14 to May 12, 1894, she was treated by me by ordinary gymnastics without weights, and she improved slightly. About the middle of May she left the city for her home in Texas, where she remained until her return here in December last.

Upon her return, December 12, 1894, I found her in much worse condition than when she first came to me in May, 1894. The treatment by heavy work was commenced December 13, 1894. The patient was very willing and apt, and progressed favorably in her work.

She exercises with a pair of three-pound bells. She pushes a thirty-pound bell about fifteen to twenty times with each hand alternately; she swings two thirty-pound bells thirty times above the head, and also swings one forty-pound bell with each hand fifty times. She raises a seventy-eight-pound bar sixteen times above the head standing, and sixteen times lying down.

I have gained so much in this case by this treatment that I am led to hope for a very good ultimate result, as the patient carries herself well now, despite the great rotation, which you see, and she works with intelligence and a will. (See Chart No. 4 and photographs.)

CASE V.—Edith S., aged sixteen years, came for treatment December 13, 1894. Had a fixed lower dorsal scoliosis to the right (C-curve), which could be partially obliterated by suspension. It was very difficult to instruct this patient in her work. She was awkward, listless, morose, and entirely devoid of will or energy, although she is reported to stand well in her studies in the Normal College of this city. She was very anæmic, and carried considerable flabby fat. She had well-marked, but painless, double flat-foot. This patient made but little progress for the first three weeks of treatment, but after that time she acquired a certain amount of grace in her movements; she exercised with a will, displayed considerable energy and strength, and improved from that time on, so that now she is practically well. I think, however, that she should continue the

treatment at intervals to offset her disposition and sedentary habits. (There are no photographs of this case.) Both feet became shorter,

December 13, 1894.

April 16, 1895.

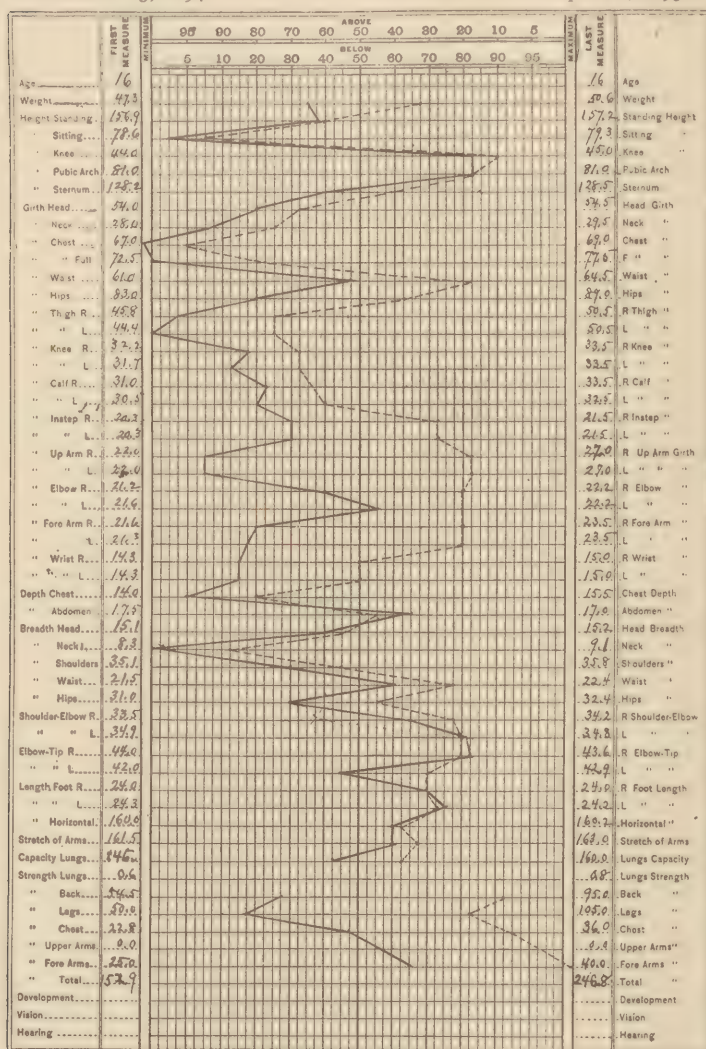


CHART No. 4.

through the increase of the depth of the arches. She uses three-

pound bells for exercises, and nearly the same heavy weights as Case III. (See Chart No. 5.)

CASE VI.—Jessie K., aged twelve years; began treatment January 29, 1895. Patient is very tall and large for her age. Had a

December 13, 1894.

April 4, 1895.

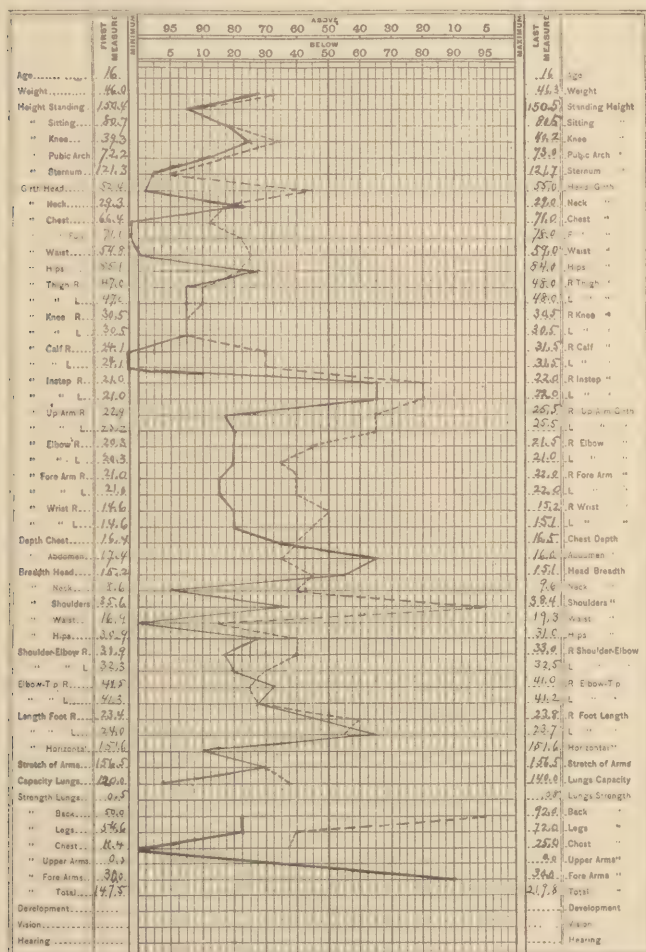


CHART No. 5.

rib exsection on left side (performed by Drs. George W. Jacoby and A. H. Friedenbergl) for empyema, before she was a year old. Mother noticed a slight S-curve of spine with very marked stoop

shoulders, and a protruding abdomen about six months before this treatment. The curve could be obliterated by the muscular efforts

January 29, 1895.

April 13, 1895.

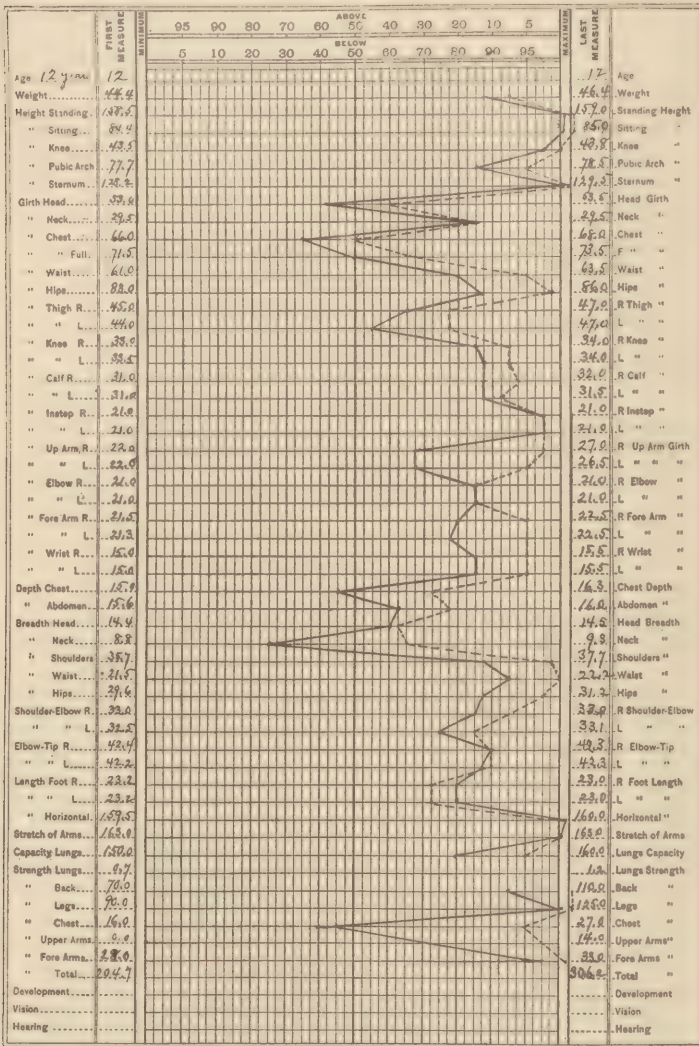


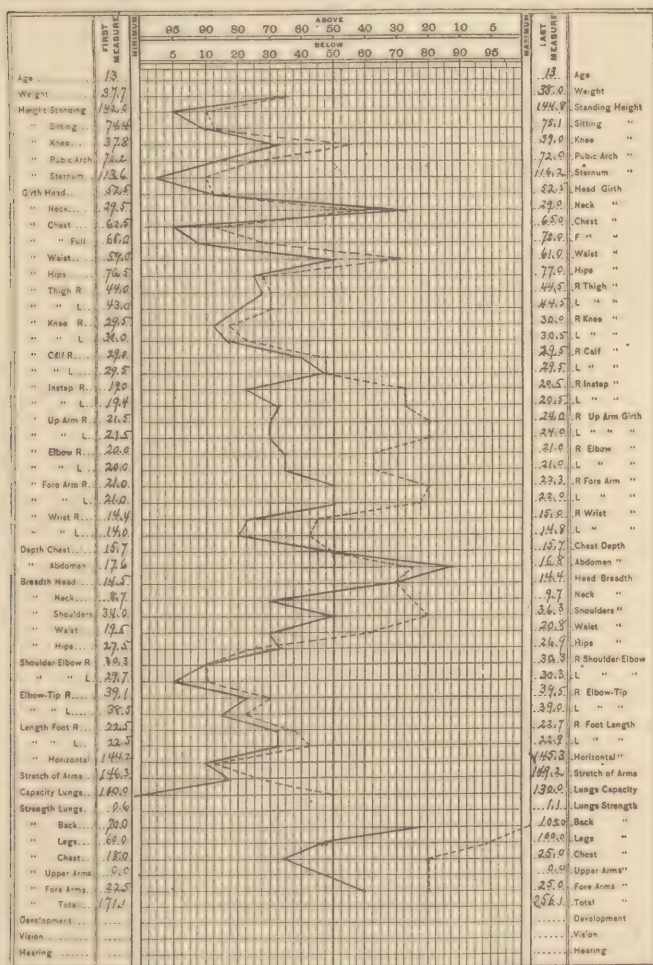
CHART No. 6.

of the patient. Exercises were begun. The patient was willing and apt, and showed marked improvement very quickly. Her mother, a very intelligent lady, reported that a vast improvement was noticed

after patient had exercised five or six times. Her entire deportment had changed. On April 13, her twentieth *séance*, she was discharged cured. On that day her record of work was the following,—viz.:

February 16, 1895.

April 18, 1895.



Second measurements taken after seventeen *séances*.

CHART No. 7.

Exercised with three-pound bells; pushed two twenty-five pound bells thirty times above the head; swung two twenty-five pound bells seven times; swung one thirty-pound bell fifteen times with

CASE VII.—Mollie N., aged thirteen years; began treatment February 16, 1895. This patient was fat, chubby, and undersized. She was brought to me for round shoulders and weak back. Examination revealed a slight habitual C-curve to the right. Patient's work, which was very good, was interrupted twice, each time for ten days, by severe attacks of tonsillitis. Her improvement in carriage was very well marked and rapid, and she was discharged cured, on April 27, after twenty *séances*, having gained 2.6 centimetres in height. Her record of work at that time was the following,—viz.: Exercised with three-pound bells. Pushed two fifteen-pound bells 100 times. Swung two twenty-pound bells twenty-eight times. Swung one twenty-five-pound bell fifty times with each hand, and raised the sixty-four-pound bar fifteen times above the head standing, and fifteen times lying down. (See Chart No. 7 and photographs.)

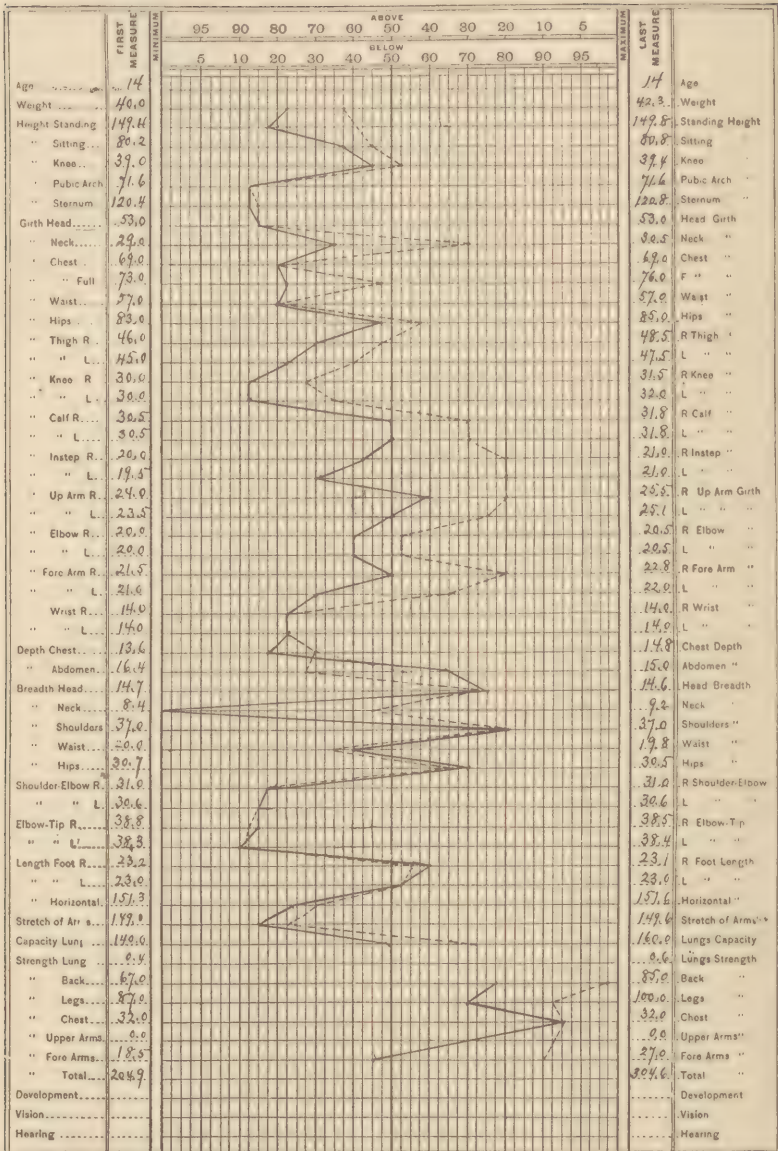
CASE VIII.—Jerome L., aged fifteen years, came for treatment February 17, 1895. The history of this case appears in the earlier part of this paper, page 3; I will therefore not repeat it. He was practically cured on April 23, having gained 2.1 centimetres in height, and his record of work was the following,—viz.: Exercised with three-pound bells. Pushed two twenty-pound bells seventy times. Swung two thirty-pound bells six times, and swung one thirty-pound bell forty times with each hand. Raised a seventy-eight-pound bar twelve times above the head standing, and twenty times lying down. (See Chart No. 8 and photographs.)

CASE IX.—Debby M., aged fourteen years; April 6, 1895. Patient had a well-marked lower dorsal curve; the right scapula was quite prominent. The deformity could be partially obliterated by muscular effort. Ordered the sole of right shoe to be raised three-eighths of an inch, and exercises commenced. The patient is intelligent and, through her strong desire to get well, was attentive and manifested much vigor, will, and perseverance in her work. Her improvement was nothing short of marvellous, as I am enabled to show her to you, six weeks from the beginning of the treatment, without any deformity. As I stated in an earlier portion of this paper, I will give the entire record of work of this patient, to demonstrate its progressive character. (See Chart No. 9 and photographs.)

A few words in defence of this heavy work against the adverse criticisms of those who might condemn it, either from their hearsay knowledge of its baneful effects, or from their own observations of athletes, who have been "trained down" for special work.

April 6, 1895.

May 14, 1895.



Second measurements taken after thirteen séances.

CHART No. 9.

RECORD OF WORK OF DEBBY M. IN CASE IX.

DATE.	REGULAR EXERCISES.	PUSHING.	SWINGING WITH EACH HAND.	SWINGING WITH BOTH HANDS.	PUSHING.	FIFTY-POUND BAR ABOVE THE HEAD.	
						Standing.	Lying Down.
1895.	Bells.	Two 10-lb. Bells.	One 15-lb. Bell. R.—L.	Two 15-lb. Bells.	Two 20-lb. Bells.		
April 6.	3 lbs.	• • • •	• • • •	• • • •	• • • •	• • • •	• • • •
" 9.	"	100	10—10	5	• • • •	Instructed.	Instructed.
" 11.	"	150	25—25	15	10	2	5
		2 15-lb. bells.	1 20-lb. bell.				
" 13.	"	50	25—25	25	12	5	10
" 16.	"	54	30—30	35	18	7	12
" 18.	"	60	35—35	40	20	7	15
			1 25-lb. bell.	2 20-lb. bells.			
" 20.	"	70	20—20	20	30	10	15
" 25.	"	90	22—22	25	33	15	16
" 27.	"	100	35—35	30	50	17	20
" 30.	"	110	50—50	35	60	20	22
May 2.	"	120	60—60	36	70	20	25
			1 30-lb. bell.		2 25-lb. bells.	64-lb. bar.	64-lb. bar.
" 4.	"	140	20—20	40	25	5	10
" 7.	"	150	25—25	45	30	7	12
" 14.	"	160	27—27	50	34	9	13
" 16.	"	170	30—30	55	40	10	14

The general health of my patients has been good. One shows a loss of weight, Case III (and that is only 0.4 kilo), which undoubtedly was caused by a recent indisposition. The heights, chest capacities, chest depths, girths, breadths, and strength-tests are generally increased, the abdominal depths are decreased, and the feet, the foundation of correct posture, are improved, inasmuch as all flat feet become shorter, and the normal feet grow. I have not detected any effect upon the hearts of the patients. All this should prove that they are not overworked.

To those gentlemen who are disposed to criticise my method of recording cases, by means of the "Sargent Charts"¹ and photographs, I will say that I know of no system which is absolute.

¹ The "Sargent charts," which are copyrighted, are printed by permission of Dr. Dudley Allen Sargent.

